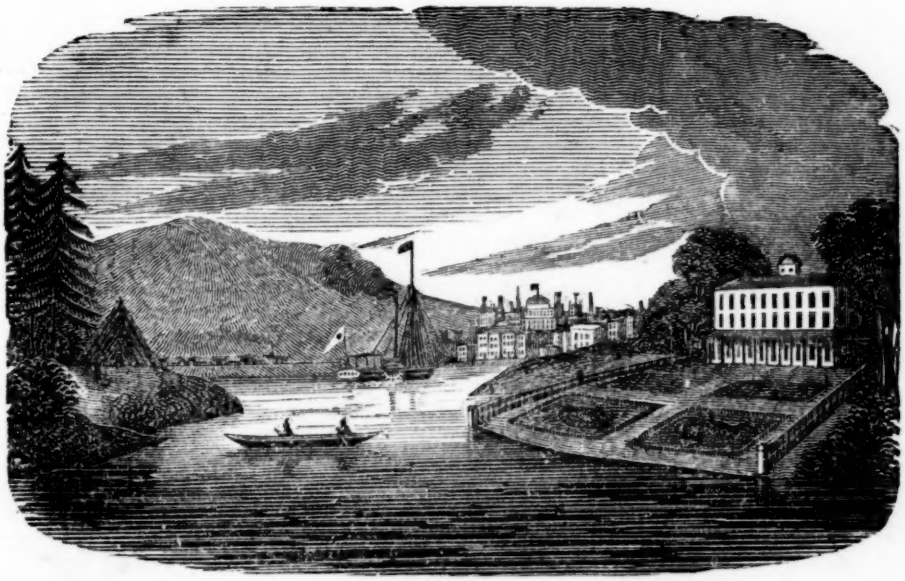
Boston

THE

MECHANIC.

A

Journal of the Useful Arts and Sciences.



'In proportion as the Arts and Sciences are cultivated, is Civilization advanced.'

EDITED BY
T. CLAXTON, GEO. W. LIGHT, AND J. M. WIGHTMAN.

Vol. III

BOSTON:
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1834.

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TO THE PATRONS OF THE MECHANIC.

The Association under whose superintendence the Mechanic is issued, regret to say, that their labors the past year have been attended with greater difficulties, in respect to patronage, than those of any year preceding. These difficulties need not be detailed at length. It is only necessary to say, that they have been occasioned mainly by the great pressure of the money market during that portion of the year when, if at all during the publication of this volume, they were likely to increase to any extent their list of patrons. They have not been able to obtain anything like enough subscribers to support the work, and a considerable portion of those who have taken it have not yet paid their subscriptions. This, of course, occasions their being left several hundred dollars in arrears. The irregular issuing of some of the numbers, which they have very much regretted, may be accounted for by this fact.

The Association, however, have not yet concluded to relinquish their efforts. Having had assistance offered them by liberal gentlemen of the professional and mercantile departments, and trusting that those of their subscribers who are in arrears will forward the amounts due by them, as soon as they learn our situation, they have concluded—feeling very sure they are right—to 'go ahead' one year longer, with renewed energy, and with additional means for making the work what it ought to be—as we think will be seen by the first number of the fourth volume. Every effort will be made to make such a work, that no mechanic in any branch of

business, will be able to say with truth that it is not calculated to be useful to him. We trust all our subscribers will conclude to continue their patronage at least one year longer, and do what they can to extend the circulation of the work. The first number of the next volume, will doubtless be published in February, and will be sent to all our present subscribers for their examination.

We feel less hesitation in making known the exact state of the concerns of the Mechanic, from the fact that it is generally believed to be well calculated to promote the end for which it is designed. We have concluded to insert at the end of this notice the following testimonial of Lt. Gov. ARMSTRONG and the respected Mayor of our city, who have uniformly exhibited a deep interest in Mechanics and the Mechanic Arts, together with that of Mr. TREADWELL, whose judgment of a work like this, will be admitted to be as good as that of any other man in the country.

WE, the subscribers, consider the 'MECHANIC, a Journal of the Useful Arts and Sciences,' a work highly meritorious and useful to mechanics, and through them to the community at large; and we hope that its publication will be sustained.

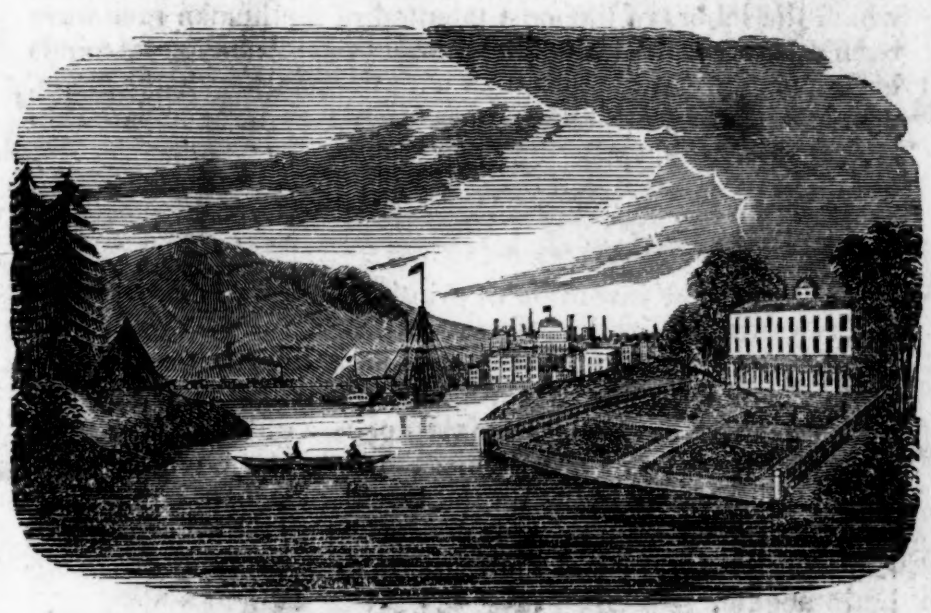
SAMUEL T. ARMSTRONG.
THEODORE LYMAN, JR.
DANIEL TREADWELL.

The Mechanic.

JANUARY, 1834.

[For the Mechanic.]

ON THE EFFECTS OF THE ARTS AND SCIENCES.



In attempting to trace the effects produced upon the character and condition of society, by the cultivation of the arts and sciences, we feel most forcibly the want of power to express the ideas occasioned by such a retrospect. Yet, to recall to memory the benefits that have resulted from this cultivation, and to anticipate those that will necessarily be the result of the still further advancement of science, is not only pleasing but instructive. To say that we have been, and are still, continually increasing in knowledge—that man

is approximating nearer and nearer to perfection—is but to repeat a self-evident truth; and of course the idea that we have but little more to acquire, is without the least shadow of foundation. If we attempt to judge of the inventions and discoveries of the future, from a review of those of the past, we must inevitably be lost in a labyrinth of conjecture; and although by reasoning from analogy we should come to the conclusion that their effects upon society would be proportionably great, yet we can hardly imagine it to be possible.

In glancing at the invention of the art of Printing, we are surprised in contemplating the immense results which it has produced in the world—dispersing, as it has, the ignorance and degradation which have ever beclouded our moral atmosphere. We are astonished at the rapidity with which a single press can accomplish that, which to imitate in former times required the united labor of thousands—at the ease and accuracy with which the labors of the most talented of the human race have been preserved. Instead of the productions of many great minds having been suffered to slumber with their authors in the grave, owing to the power of the press, they may be compared to the phœnix, who, springing from his ashes,

> 'On renovated wings,
> Ascends, exulting, from his funeral flame,
> And soars, and shines, another and the same.'

But although the invention of printing has done more, probably, towards civilization, than any other of the arts or sciences, yet, for the extensive benefits which it has bestowed, it is greatly indebted to the improvements in Navigation. The Phœnician mariner, dependent for the success of his voyage upon clear and cloudless nights, when the pole star could be seen, which was his only guide on the trackless ocean, could have contributed but little towards disseminating the art of printing through the world; and therefore, the discovery of the magnetic needle,

> 'By which the modern pilot roams afar,
> Cleaves the dark air, and asks no other star,'

may indeed be considered next, if not equal in importance, to the invention of the art of printing, as regards the progress of civilization. We find no truth more evident, than that 'in all arts and sciences, there is a common bond of union;' and the degree of influence which they exert on the success of each other, it is impossible to determine. We cannot conceive of the art of printing independent of all other arts and sciences; because it is merely a combination, in which the

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sciences of chemistry and mechanics are blended to produce a certain effect; and for its extensive usefulness, it is not only indebted to the discovery of the magnetic needle, but also to the science of Astronomy, and the application of the power of Steam to the purpose of navigation: and these are all so intimately interwoven with each other, that, as with the Gordian knot, it is impossible to separate them.

Both the science of Astronomy, as now understood, and the invention of the Steam Engine, are among the discoveries and inventions of modern times. Within two centuries, the first dawn of modern Astronomy appeared in Europe. The brilliant mind of Copernicus has established the true arrangement of the solar system, and presented it in beauty and perfection above the horizon—from which, by the sublime conceptions of Kepler and Newton, the sun of Astronomy has arisen to its zenith, and appeared in all its meridian splendor. The magic tube of Gallileo, by the discovery of new planets, the establishing new truths, and enabling Astronomers to explain the various phenomena of the heavens, has assisted in no small degree in overthrowing that system of ignorance and superstition in which the world was enveloped for so many ages.

Cotemporary with the advancement of modern Astronomy, is the invention of the Steam Engine. Simple in its construction, but wonderful in its effects, and infinite in its application, it stands unrivalled, as a monument of human ingenuity and enterprise. No example of this truth can be cited which will call up such thrilling sensations in the bosom of an American, as the application of steam to navigation. An interesting train of reflections crowd upon the imagination at the mere mention of the subject. The beautiful and uniform movements of the steam engine, urging onward with unsurpassing speed the numerous boats scattered over the smooth waters of the Hudson, the Delaware, the Connecticut, and Ohio, successfully resisting the united efforts of wind and tide, and apparently forcing the Mississippi to reverse its course, by propelling both vessel and cargo against the impeding current; the effect which has been produced upon the settlement and civilization of our western territories—the rude log-huts disappearing along the banks of the Mississippi—the wild prairies covered with luxuriant vegetation—cities, towns and villages rising, as if by magic—the peaceful lowing of the cattle in the fields, instead of the shrill war-whoop resounding through the forest; all combine to produce a noble representation of the effect of the culti-

vation of the arts and sciences upon civilization. And when we consider, that to the genius, perseverance and enterprise of one of our own countrymen, we are indebted for this improvement of our western wilds, we cannot fail to respond with fervor to the exclamation of the patriot,

'This is my own, my native land.'

Boston, Jan. 14, 1834. JUNIUS.

PATENTS.

A DIFFERENT course will be pursued in future in our Magazine, with regard to patents. Thus far, we have confined our notices chiefly to Massachusetts; but we shall hereafter select a few of the best from the whole—and now and then one of a different character, for the purpose of criticism, and for giving advice, such as will tend in some degree to prevent others from following in similar tracks.

[From the Journal of the Franklin Institute.]

PATENT *for Apparatus for Propelling various kinds of Machinery;* Thomas P. Codman, Boston, Massachusetts, April 20, 1833.

Among the powers employed by the mechanician to give motion to instruments of various kinds, those of air, water, and animal strength, stand conspicuous; but, in general, he uses only one of these at a time, as it is, in most cases, a thing of no small difficulty to bring them into accordance with each other, in the production of a single effect. It is the province of genius, however, to bring together, in harmonious conjunction, things which common minds would consider as incompatible, and therefore scarcely dream of placing in juxtaposition. Such a rare combination has been effected in the machine, or concatenation of machines, which is the subject of the patent before us. Horses, water, and air, and sometimes manual power also, are each to furnish their quota in making up the sum total of the power which is to be engendered. Some parts of the affair, as described, appear, it is true, rather enigmatical; but at this we ought not to be greatly surprised, as it is no new thing to assume this style in the first introduction of new and important truths. Being fearful of undertaking to epitomize the patentee's description in any considerable degree, we will give his account of the thing, in nearly his own words.

As many horses, or other animals, as may be desired, are to be placed upon an inclined movable floor, causing a shaft and drum to revolve in the usual way. The shaft is to turn a number of eccentrics, each of which is to operate upon a forcing pump, by which water is to be raised from a cistern, and forced into a cylinder. The air in the cylinder must not be allowed to escape, but is to become condensed by the continued forcing in of the water. The air, so compressed, is to force the water from the cylinder through a tube leading from the bottom of the first into the bottom of a second cylinder; in this it is alternately to compress the bottom and top of a piston, and is to escape therefrom through two pipes, one leading from the top and the other from the bottom of this second cylinder, by both of which it is to be returned into the cistern from which it was first taken, and to be there in readiness to pass again through the same routine.

To the first named cylinder, which is represented in the drawing as standing horizontally, like those of steam engine boilers, a condensing pump is to be attached to force in air, the pressure of which may be made equal to that of several atmospheres. The eccentrics before named, operating as cranks, are to be placed on one common shaft, so as to act alternately, to keep the supply of water, and the pressure equal. Fly wheels are to be employed to regulate the motion. When air alone is to be used, the water pumps are to operate as condensing air pumps, 'the air acting in the cylinder the same as the water.'

The machine to be propelled may be attached to the shaft, or piston rod of the second cylinder, drums and bands being used to increase or decrease the velocity, by varying their size. The claim is to the 'manner herein described of combining and applying the herein specified powers so as to propel various kinds of machinery.'

The following remarks on the above patent, have been handed to us by an old correspondent.—Eds. Mec.

Messrs. Editors:—Those who observe the progress of invention, frequently hear of attempts to produce results, by means not only badly adapted to the object in view, but that have a direct contrary tendency. I think it would require but a little mechanical knowledge, and a small portion of common sense, to show that the above-described machine is one of this kind; and further, that a few more such helps as are there mentioned and termed *powers*, would very soon

bring the horses to a stand. The fact is, that the horses constitute all the moving power there is in this machine—that the friction of the various pistons and of the water passing through bent tubes is very great, and must be taken from the power which the horses possess, leaving so much less power for the purpose the machine is intended to accomplish.

No power can be gained by raising water from a cistern, and suffering it to press on a wheel, or a piston, in its descent to the cistern again; but there is always a loss. If we find water at a superior elevation, it may be used to advantage in its descent; but to return the same water back again, more power would be required than was gained by its fall. Competent judges say, that a machine on this principle would not work well, even if we had a suitable fall of water; owing in part to the water being so nearly non-elastic, but principally, to the great degree of friction which is caused by the rapid passage of water through the pipes with their necessary bends. Very few situations can be found, where machines, acting by water pressing on a piston, can be used to advantage; and these are, where the quantity of water is small, and the fall very great.

A machine of a similar character to the above, was patented in Europe about a year ago. Some remarks which I made upon that, may be found on page 113, Vol. 2, of this work.

PHILO.

RICE PAPER.

The fine and beautiful tissue brought from China and Calcutta, and employed under the name of *rice paper*, is far from being an artificial substance fabricated from rice or any other farinaceous material. By holding a specimen of it between the eye and a clear light, it will be seen to consist of a vegetable tissue, composed of cellules so exactly similar, and so perfect, that no preparation of a paper could be possibly made to acquire.

It is now known to be made of the internal part of the *Œschynomene paludosa*, Roxburg,—a leguminous plant which grows abundantly on the marshy plains of Bengal, and on the borders of vast lakes between Calcutta and Hurdwart. It is a hardy plant, requiring much moisture for its perfect growth

and duration. The stem rarely exceeds two inches in diameter, spreading extensively, but not rising to any great height.

The stems of this plant are brought in great quantities in Chinese junks, from the island of Formosa and other places, to China and Calcutta. These stems are cut into the lengths intended for the leaves or sheets, and then, by means of a very sharp and well tempered knife, about ten inches long and three inches wide, the pith is divided into thin circular plates, which, being pressed, furnish the leaves sold under the name of rice paper. The operation of cutting the leaves is very similar to that of cutting corks. The leaves are generally seven or eight inches long and five wide; some are even a foot long. Those which are not fit for drawing are colored for other purposes. Rice paper absorbs water, and swells so as to present an elevation, which continues after it becomes dry, and gives to the drawing a velvety appearance and a relief, which no other kind of paper produces.

Rice paper may, with care, be written upon, as the ink does not spread. The writing is glossy, showing some metallic surfaces.

Examined chemically, it seems to be analogous to the substance which Dr. John calls medulline. Treated with nitric acid, it forms oxalic acid.

The white and pure specimens are much used for drawings; the inferior are variously colored, and now extensively used in forming artificial flowers. In India, a pasteboard is made by cementing many leaves together, and of this hats are fabricated, which, covered with silk or other stuff, are firm and extremely light.

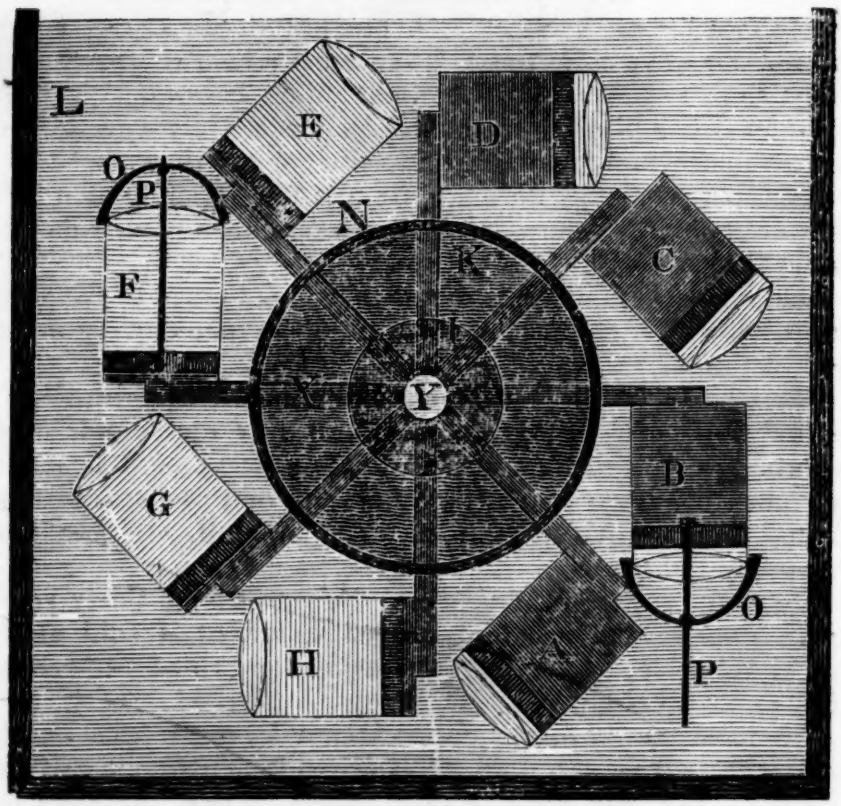
Rice paper was introduced into Europe about thirty years ago. The flowers which were first made of it sold at an exorbitant price. A single bouquet cost the Princess Charlotte of Wales £70 sterling.

From the quality of this paper, it may be most successfully employed in painting butterflies, flowers, birds, plants, and animals. For this purpose, the object is first sketched on common paper, which is then to be pasted on a card. The sketch must be of a deep black. On this the rice paper is fastened, and the painting effected with a pencil and fine colors. When executed in this way, by the most skilful hands, the pictures of butterflies, insects, &c. have been often mistaken for the animal itself pasted on paper. Rice paper has also been employed in lithography, with the most brilliant effect.

It is desirable for the purposes of art, that some aquatic plant should be found in our own climate whose pith is analogous to that of the Œschynomene. Is it not possible, also, to frabricate a paper, the tissue of which may absorb water, and furnish the relief which gives to rice paper its greatest value?—Jour. des Connais. Usuelles.

[For the Mechanic.]

NEW WATER WHEEL.



Messrs. Editors:—I send you a description, together with a drawing, of a newly-proposed Water Wheel, which I shall term, an 'Uniting Air and Water Wheel.' I have shown the above to some friends; and all the objection they have to it is, that it appears too much like a perpetual motion. As I presume this will be the case with many others, I would ask them to point out that which will retard its operation.

In the drawing above, is represented, the cistern L filled with water; ABCDEFGH are all cylinders alike; I is the axle

of the wheel; Y is the box or bearing; K is an open space surrounded by the cylinder N, and is perfectly tight, to prevent the water from the cistern from entering the space between the axle and the cylinder N. The space K should be calculated large enough to buoy up the wheel, to prevent the friction on the bearing Y. In each of the cylinders ABCDEFGH is a solid lead piston, to which a rod P is attached, that passes through the semi-circular support O, (which are represented in the two cylinders, B and F,) to guide the piston in the cylinder. Although the piston rods and supports are affixed only to the two cylinders B and F, yet all of them are intended to be arranged in the same way.

To explain the operation, we will now suppose there are only the two cylinders B and F upon the wheel. F is filled with water, on account of the piston having fallen to the bottom of the cylinder, and the air which occupied the cylinder before the descent of the piston has been forced through the pipe X, which connects with the cylinder B. It will now be seen that the piston is at the lower end of B, and the cylinder is filled with air: consequently the cylinder F is as much heavier as the water it contains is heavier than the air in the cylinder B; therefore one will rise and the other descend, on account of the difference in their weight. By now taking the cylinders collectively, it will be seen that ABCD, being filled with air, and EFGH with water, the tendency of ABCD to rise, and of EFGH to descend, will naturally make the wheel revolve. But the two cylinders DH, in their present positions, will retard the motion a little, until the cylinder D nearly gains the place of E; but I look upon this as very small, when compared with the power which the others gain.

I am aware that a wheel of the above description would require good calculation, and the very best of workmanship. It should not, I think, be tried on a smaller scale than to have the cylinders contain two gallons each. As my means will not allow me to try the experiment, I submit it to the public for their decision.

P. S.—I perceive I have made one mistake, in not putting both ends of the cylinders at an equal distance from the centre of the wheel, by which it will be seen that the pistons in the cylinders filled with water, are farther from the centre of the wheel than the others; but this can be easily altered.

Lowell, Nov. 2, 1833. W. W. C.

We invite the attention of our friends to the above description of a New Water Wheel; perhaps some one of them can either confirm the inventor in his good opinion of it, or point out his error.—EDS. MEC.

Mechanic Fund Association.

About two years ago, six individuals united themselves into an Association for the purpose of conducting and issuing on their own responsibility a Mechanics' Magazine. 'Having observed—and with no small degree of regret—the ill success of several works for mechanics in this vicinity, they thought it inexpedient to attempt the establishment of a very large or in any respect a very expensive magazine. But they were fully persuaded, that by adopting the principle upon which all undertakings should be commenced—to begin according to their means and the prospects before them—they might in time be able to effect the object which their predecessors in this part of New England had failed to accomplish.' This principle was acted upon, and the publication of two volumes of this work, each containing 192 pages, has thus far been the result of their efforts. But, as was remarked in the last number, 'the Association, having labored for the magazine gratuitously since its commencement, and also incurred some loss in its publication, considered it against their duty to pursue the object farther, unless an arrangement could be made to place it upon a more firm basis. This they had learned could not be done without enlarging it, making a variety of improvements, and raising the price.'

Under these circumstances, it was thought best to make an effort to increase the number of the Association, by inviting individuals interested in the progress of the arts and sciences to become members, and also to solicit donations from gentlemen interested in its objects. This measure was vigorously pursued, and the result has far exceeded their anticipations. They found other individuals willing to assist, not only in forwarding the magazine, but in prosecuting measures for the encouragement of mechanical genius. From this has sprung the Mechanic Fund Association, whose objects are stated in the annexed Constitution.

Several meetings have been held, at which considerable spirit was manifested; and the Association believe they have sufficient foundation to trust, that, although their society is now in its infancy, they shall be able, with the means they have in their possession and which there is every prospect of acquiring, to

perform not an unimportant part in elevating the condition of the class to whom their efforts will be devoted.

Reports of the transactions of the Association will be published from time to time, as subjects of importance shall be discussed.

CONSTITUTION.

ARTICLE 1.—This Association shall be known by the name of the MECHANIC FUND ASSOCIATION.

ART. 2.—The objects of the Association shall be, the intellectual improvement of Mechanics, and the advancement of the Mechanic Arts. The means by which these objects are proposed to be effected are, the immediate establishment, on a permanent basis, of a Mechanics' Magazine, open to all persons who may wish to contribute articles on the useful Arts and Sciences, and the encouragement of inventors of useful articles, by examining their Plans, Models, &c., giving them advice, and recommending meritorious persons to the public, by giving them Certificates setting forth their claims to patronage, and by making suitable mention of them in the Magazine.

ART. 3.—The Officers of this Association shall be a President, Treasurer and Secretary ; to be chosen annually, on the first Monday in January—who shall constitute a Board of Managers, and Committee of Finance, and to whom shall be given in charge the general affairs of the Association. They shall be required to report once in three months to the Association. Other Committees may be appointed when necessary.

ART. 4.—The Association shall hold at least four meetings in each year, including the annual meeting—viz., on the first Monday in January, April, July and October. For the purpose of hearing the reports of Committees, and the transaction of such business as may be found expedient to carry into effect the objects of the Association, special meetings may be held, by the direction of the Managers, or at the request of the holders of one-third of the shares.

ART. 5.—The President shall preside at the meetings of the Association and of the Managers ; and in his absence a President pro tem. may be appointed. The Treasurer shall receive and take charge of the fund belonging to the Association, and shall pay all bills under the direction of the Committee of Finance. He shall be required to give bonds, and to pay over the balance to the Association, when they shall so direct. The Secretary shall keep a record of the doings of the Association and of the Managers, and notify all their meetings.

ART. 6.—Each share-holder shall have the privilege of voting, according to the number of shares held by him, to the extent of five votes, and

no more; he may also vote by proxy, by sending written directions to that effect.

ART. 7.—In order the better to carry the designs of the Association into effect, a Fund is to be raised, by donations, and by shares of twenty dollars each. The shares may at any time be transferred to any individual whom the Association may admit a member by a unanimous vote.

ART. 8.—Alterations may be made in this Constitution at any regular meeting of the Association, by three-fourths of the votes given in favor of such alteration; the same having been proposed in writing at a previous meeting, and specified in all the notifications calling the meeting to act on such alteration.

The present Officers of the Association are—DR. WILLIAM GRIGG, President; CAPT. ALEXANDER PARRIS, Treasurer; DUNBAR B. HARRIS, Secretary. A Standing Committee on Inventions will probably soon be appointed, who will give due notice to inventors as soon as the necessary arrangements shall be made, as to the conditions to be observed in sending in articles for examination, together with the place or places at which they will be received.

The following persons have been appointed to conduct the Magazine for this year:—TIMOTHY CLAXTON, GEO. W. LIGHT, and J. M. WIGHTMAN.

[From the Jour. des Connais. Usuelles.]

VALUABLE MATERIAL FOR WALKS AND ALLEYS.

A SOAP-MAKER not knowing what to do with the black sulphurous residuum of his ley tubs, spread it in a wet state along the alleys of his garden. It soon became stiff and almost impervious to rain; the alleys were always dry; no grass or weeds appeared on it, but the plants within a few inches of it all died. He was delighted with this discovery of the means of enjoying clean and dry walks without any trouble, having only to put a covering of clean sand over the refuse. Having occasion some time after to repave his yard, he used the soft refuse instead of mortar. It soon hardened and cemented the stones so well, that the heaviest carriages occasioned no disadjustment.

LAW OF PATENTS—IMPORTANT DECISION.

An important patent case has been tried before the United States District Court, Judge Story, sitting in this city. It was an action for an infringement of a patent right in a machine for the manufacture of paper. The plaintiff was John Ames of Springfield, one of the oldest and most extensive paper manufacturers in the United States, and the defendants, Howard and Lathrop, paper makers. Counsel for the plaintiff, B. Rand and William Bliss; for defendants, Fletcher and George Bliss. The case was opened Wednesday week, and occupied the court until Tuesday afternoon. It was argued with great zeal and ability by the counsel, and Judge Story's charge was minute and unequivocally in favor of the plaintiff. The jury gave a verdict for the plaintiff—damages $412.50.

It is understood that the case will be carried up to the Supreme Court. It is said to be the most important patent case ever tried here, owing to the value of the machine, and the extent to which it has been appropriated by others. Mr. Ames invented the machine, and made his specification in 1823, but owing to some defect in the specification, his patent right did not accrue. Recently Congress passed an act reviving old inventions, the benefit of which had been lost to their authors, by new specifications. Mr. Ames complied with this law, and revived his old patent in 1833. In the mean time his machine had become almost universally used in the paper manufacture all over the United States. It had superseded every other machine but one, and it is said that a capital of four millions is invested in the manufacture of paper, carried on by this invention. Its value may be supposed from the fact that it will take from the pulp and throw out a sheet of paper per minute.

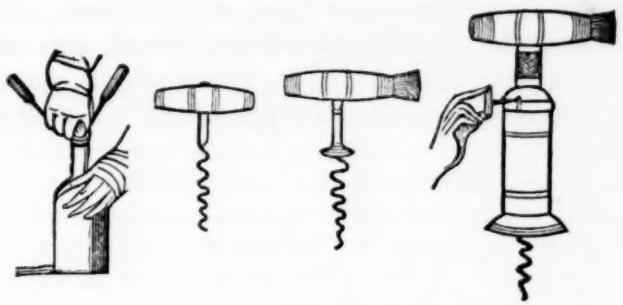
The defendants were not aware that they were infringing a patent right, but the judge charged the jury that this made no difference as to the actual infringement. The action was brought for the use of two machines, and if the plaintiff is sustained on the appeal to the Supreme Court, a similar action will be maintained against all who use the invention without the consent of the patentee.

Boston, Nov. 7th, 1833.

PROGRESS OF INVENTION EXEMPLIFIED.

MANY volumes have been written on the gradual refinements of language, and learned men have pointed out the immense stride in improvement which has arisen from an unimportant innovation, yet millions had spoken the imperfect language without dreaming of the simple means by which the finishing touches could be given to it. The effects also which have flowed from apparently the most simple contrivances are almost incredible; and should those who are familiar with their most perfect forms be but casual observers, they may be startled at the exaggerated terms in which their value may be estimated—or disgusted with the claims of some mechanic, who, by merely adding a wheel or pulley, or giving a trifling difference to their proportions, may, by these means, have been the first to make the machine efficient. The simple process of drawing a cork will furnish the necessary illustrations.

The inventor of bottles is unknown; but these were in use for centuries before corks were thought of, and these again were employed for generations before a convenient method was hit upon for their extraction. The exhilerating contents could then only be tasted by what is now technically called 'beheading the bottle.' More expert practitioners had many opportunities of showing their skill in removing the impediment by a dexterous twist of the fingers; or, if that were impracticable, teeth were called in as their natural auxiliaries; here, however, in many cases, it was doubtful whether the cork would follow the teeth, or the teeth remain *in* the cork; and if an obstinate remnant would remain, a *nail* was a ready means of dislodging the stubborn plug, particle by particle,—when at any time, through an impatience of the nibbling labor, or a despair of accomplishing a clean extraction at all, it was resolved at once to send the obstacle the wrong way; this was then, indeed, an invaluable instrument.

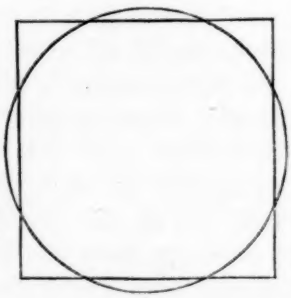


A pair of skewers, or forks, inserted 'witchwise,' would sometimes accomplish those difficult cases which had baffled the exertions of all the naturals. Twisting the lower extremity of the 'bare bodkin' into a spiral form, and adding a handle to it, was the thought of a master genius; and, in this shape, mankind, for ages, were contented to avail themselves of its services—and even at the present hour, some barbarous, uncouth countries and districts may be named where it is still the extractor in most general use. In our civilized land, it must be yet in the recollection of many, that this was, in numerous cases, a very inefficient machine; and the pleasure of beholding the generous beverage beaming through a crust of many years, was cruelly damped by the experience, that in proportion to the pains taken in fixing the cork, was the mental agony which must be endured during all attempts to remove it. Jovial fellows, who forget those days, in their moments of inspiration, may talk indeed of their Phillises, their Ianthes, their Delias, their Saccharissas, their Chloes, and their what-nots,—let them henceforth mingle a little gratitude with their admiration, and glorify a nymph greater than them all. Miss O'Rourke, like her own exquisite poteen punch, was a delightful compound from ingredients, both mental and corporeal, of the most opposite nature. The friend of Kosciusko, and the authoress of the Rhapsody, which afterwards rung so often throughout the country to the favorite tune (Gramachree) of the patriot Pole,—such another hostess was not in England wide, and no other of her order ever conferred so great a benefit on bottle-suckers as she did, by her superlative invention of placing a *button* at the end of the screw-worm. Henceforth the decantering process was a mere matter of routine. When, in her green old age, Death laid his hand on the inventress, a piratical screw-maker took to himself the credit and profit of the button addendum. Yet Miss O'Rourke shall never be forgotten, even although her

master-piece, some few years later, was eclipsed, and may be yet superceded by the *King's Screw*, which can receive no addition either to its beauty or convenience, except it be probably some little steam appendage to make it self-acting.

[From the London Mechanics' Magazine.]

MECHANICAL QUADRATURE OF THE CIRCLE.



Sir :—The accompanying diagram exhibits a mechanical quadrature of the circle effected by Mr. Heaton, which I believe to be quite original; the rule thereby obtained is sufficiently accurate for all practical purposes. From a piece of carefully rolled sheet brass was cut out a circle 1·9 inches diameter, and a square of 1·7 inches. On weighing them they were found to be of exactly the same weight, which proves that as each are of the same thickness, the surfaces must also be precisely similar. The rule, therefore, is that the square is to the circle as 17 is to 19. Mr. Heaton made a number of experiments before he hit upon the right measurement, which he has at length determined with as much accuracy as the case will admit of.

I am, sir, yours, very respectfully,

William Baddeley.

London, Aug. 19th, 1833.

BIOGRAPHY.

Brief sketches of the lives and performances of men, to whom we are indebted for many of the conveniences and luxuries we enjoy, cannot but be interesting to every friend of improvement. It will therefore be considered as a part of our duty, to introduce to our readers such notices of men of genius and talent, as may be deemed appropriate to the objects of the Magazine. Aid is accordingly solicited from those in possession of materials, or who may be able to procure them, for this department of the work.

An account of Robert Fulton, together with his invention of the Steam Boat, was first decided upon for this number; but on reflection it was thought best, in the first place, to trace the invention of the Steam Engine itself, and in our next number to give some account of its perfector, James Watt.

THE STEAM ENGINE.

All the inventions and improvements of recent times, if measured by their effects upon the condition of society, sink into insignificance, when compared with the extraordinary results which have followed the employment of steam as a mechanical agent. To one individual, the illustrious James Watt, the merit and honor of having first rendered it extensively available for that purpose are preeminently due. The force of steam, now so important an agent in mechanics, was nearly altogether overlooked until within the two last centuries. The only application of it which appears to have been made by the ancients, was in the construction of the instrument which they called the Æolipile, that is, the Ball of Æolus. The Æolipile consisted of a hollow globe of metal, with a long neck, terminating in a very small orifice, which, being filled with water and placed on a fire, exhibited the steam, as it was generated by the heat, rushing with apparently great force through the narrow opening. A common tea-kettle, in fact, is a sort of Æolipile. The only use which the ancients proposed to make of this contrivance was, to apply the current of steam, as it issued from the spout, by way of a moving force—to propel, for instance, the vans of a mill, or, by acting immediately upon the air, to generate a movement oposite to its own direction. But it was impossible that they should have effected any useful purpose by such methods of employing steam. Steam depends so entirely for its existence in the state of vapor upon the presence of a large quantity of heat, that it is reduced to a mist or a fluid almost immediately on coming into contact either with the atmosphere, or anything else which is colder than itself; and in this condition its expansive force is gone. The only way

of employing steam with much effect, therefore, is to make it act in a close vessel. The first known writer who alludes to the prodigious energy which it exerts when thus confined, is the French engineer Solomon de Caus, who flourished in the beginning of the seventeenth century. This ingenious person, who came to England in 1612, in the train of the Elector Palatine, afterwards the son-in-law of James I. and resided here for some years, published a folio volume at Paris, in 1623, on moving forces; in which he states, that if water be sufficiently heated in a close ball of copper, the air or steam arising from it will at last burst the ball, with a noise like the going off of a petard. In another place he actually describes a method of raising water, as he expresses it, by the aid of fire, which consists in the insertion, in the containing vessel, of a perpendicular tube, reaching nearly to its bottom, through which, he says, all the water will rise, when sufficiently heated. The agent here is the steam produced from part of the water by the heat, which, acting by its expansive force upon the rest of the water, forces it to make its escape in a jet through the tube.* The supply of the water is kept up through a cock in the side of the vessel. Forty years after the publication of the work of Dr. Caus appeared the Marquis of Worcester's famous 'Century of Inventions.' Of the hundred new discoveries here enumerated, the sixty-eighth is entitled 'An admirable and most forcible way to drive up water by fire.' As far as may be judged from the vague description which the Marquis gives us of his apparatus, it appears to have been constructed upon the same principle with that formerly proposed by De Caus; but his account of the effect produced is considerably more precise than what we find in the work of his predecessor. 'I have seen the water run,' says he, 'like a constant fountain-stream forty feet high; one vessel of water rarified by fire, driveth up forty of cold water.' This language would imply that the Marquis had actually reduced his idea to practice; and if, as he seems to intimate, he made use of a cannon for his boiler, the experiment was probably upon a considerable scale. It is with some justice, therefore, that notwithstanding the earlier announcements in the work of the French engineer, he is generally regarded as the first person who really constructed a steam-engine.

* In the same work De Caus proposes another apparatus for raising water simply by the pressure upon its surface in a close vessel, of the air rarified by the heat of the sun. This process may be often observed taking place on a small scale in what is called the Fountain Ink-glass, in which, in a warm day or a heated room, the liquid will be forced up sometimes to the very lip of the spout, by the expansion of the superjacent air within the vessel.

About twenty years after this, namely, in the year 1683, another of our countrymen, Sir Samuel Morland, appears to have presented a work to the French King, containing, among other projects, a method of employing steam as a mechanic power, which he expressly says he had himself invented the preceding year. The manuscript of this work is now in the British Museum; but it is remarkable that when the work, which is in French, was afterwards published by its author at Paris, in 1685, the passage about the steam-engine was omitted. Sir Samuel Morland's invention, as we find it described in his manuscript treatise, appears to have been merely a repetition of those of his predecessors, De Caus and the Marquis of Worcester; but his statement is curious as being the first in which the immense difference between the space occupied by water in its natural state and that which it occupies in the state of steam is numerically designated. The latter, he says, is about two thousand times as great as the former; which is not far from a correct account of the expansive force that steam exerts under the ordinary pressure of the atmosphere. One measure of water, it is found, in such circumstances, will produce about seventeen hundred measures of steam.

The next person whose name occurs in the history of the steam-engine, is Denis Papin, a native of France, but who spent the part of his life during which he made his principle pneumatic experiments in England. Up to this time, the reader will observe, the steam had been applied directly to the surface of the water, to raise which, in the form of a jet, by such pressure, appears to have been almost the only object contemplated by the employment of the newly discovered power. It was Papin who first introduced a piston into the tube or cylinder which rose from the boiler. This contrivance, which forms an essential part of the common sucking pump, is merely, as the reader probably knows, a block fitted to any tube or longitudinal cavity, so as to move freely up and down in it, yet without permitting the passage of any other substance between itself and the sides of the tube. To this block a rod is generally fixed; and it may also have a hole driven through it, to be guarded by a valve, opening upwards or downwards, according to the object in view. Long before the time of Papin it had been proposed to raise weights, or heavy bodies of any kind, by suspending them to one extremity of a handle or cross-beam attached at its other end to the rod of a piston moving in this manner in a hollow cylinder, and the descent of which, in order to produce the elevation of the

weights, was to be effected by the pressure of the superincumbent atmosphere after the counterbalancing air had been by some means or other withdrawn from below it. Otto Guericke use to exhaust the lower part of the cylinder, in such an apparatus, by means of an air-pump. It appeared to Papin that some other method might be found of effecting this end more expeditiously and with less labor. First he tried to produce the requisite vacuum by the explosion of a small quantity of gunpowder in the bottom of the cylinder, the momentary flame occasioned by which he thought would expel the air through a valve opening upwards in the piston, while the immediate fall of the valve, on the action of the flame being spent, would prevent its re-intrusion. But he never was able to effect a very complete vacuum by this method. He then, about the year 1690, bethought him of making use of steam for that purpose. This vapor, De Caus had long ago remarked, was recondensed and restored to the state of water by cold; but up to this time the attention of no person seems to have been awakened to the important advantage that might be taken of this one of its properties. Papin for the first time availed himself of it in his lifting machine, to produce the vacuum he wanted. Introducing a small quantity of water into the bottom of his cylinder, he heated it by a fire underneath, till it boiled and gave forth steam, which, by its powerful expansion, raised the piston from its original position in contact with the water, to a considerable height above it, even in opposition to the pressure of the atmosphere on its other side. This done, he then removed the fire, on which the steam again became condensed into water, and, occupying now about the seventeen hundredth part of its former dimensions, left a vacant space through which the piston was carried down by its own gravitation and the pressure of the atmosphere.

The machine thus proposed by Papin was abundantly defective in the subordinate parts of its mechanism, and, unimproved, could not have operated with much effect. But, imperfect as it was, it exemplified two new principles of the highest importance, neither of which appears to have been thought of, in the application of the power of steam, before his time. The first is the communication of the moving force of that agent to bodies upon which it cannot conveniently act directly, by means of the piston and its rod. The second is the deriving of the moving force desired, not from the expansion of steam, but from its other equally valuable property of condensibility by mere exposure to cold. Papin, however, it is

curious enough, afterwards abandoned his piston and method of condensation, and reverted to the old plan of making the steam act directly by its expansive force upon the water to be raised. It is doubtful, whether he ever actually erected any working engine upon either of these constructions. Indeed, the improvement of the steam-engine could scarcely be said to have been the principal object of those experiments of his, which, nevertheless, contributed so greatly to that result. It was, in fact, as we have seen, with a view of perfecting a machine contrived originally without any reference to the application of steam, that he was first induced to have recourse to the powers of that agent. The moving force with which he set out was the pressure of the atmosphere; and he employed steam merely as a means of enabling that other power to act. Even by such a seemingly subordinate application, however, of the new element, he happily discovered and bequeathed to his successors the secret of some of its most valuable capabilities.

We may here conveniently notice another ingenious contrivance, of essential service in the steam-engine, for which we are also indebted to Papin—we mean the safety-valve. This is merely a lid or stopper, closing an aperture in the boiler, and so loaded as to resist the expansive force of the steam up to a certain point, while at the same time, it must give way and allow free vent to the pent-up element, long before it can have acquired sufficient strength to burst the boiler. The safety-valve, however, was not introduced into the steam-engine either by Papin, or for some years after his time. It was employed by him only in the apparatus still known by the name of his *digester*, a contrivance for producing a very powerful heat in cookery and chemical preparations, by means of highly concentrated steam.

We now come to the engine invented by Captain Savery, in 1698. This gentleman, we are told, having one day drank a flask of Florence wine at a tavern, afterwards threw the empty flask upon the fire, when he was struck by perceiving that the small quantity still left in it very soon filled it with steam, under the influence of the heat. Taking it up again while thus full of vapor, he now plunged it, with the mouth downwards, into a basin of cold water, which happened to be on the table; by which means the steam being instantly concentrated, a vacuum was produced within the flask, into which the water immediately rushed up from the basin. According to another version of the story, it was the accidental circumstance of his immersing a heated tobacco-pipe

into water, and perceiving the water immediately rush up through the tube, on the concentration by the cold of the warm and thin air, that first suggested to Savery the important use that might be made of steam, or any other gas expanded by heat, as a means of creating a vacuum. He did not, however, employ steam for this purpose in the same manner that Papin had done. Instead of a piston moving under the pressure of the atmosphere through the vacuum produced by the concentration of the steam, he availed himself of such a vacuum merely to permit the rise of the water into it from the well or mine below, exactly as in the common sucking-pump. Having thus raised the water to the level of the boiler, he afterwards allowed it to flow into another vessel, from whence he sent it to a greater height by the same method which had been many years before employed by the Marquis of Worcester,—namely, by making the expansive force of the steam act upon it directly, and so force it up in opposition to its own gravity and the resistance of the atmosphere.

Savery showed much ingenuity and practical skill in contriving means of facilitating and improving the working of the apparatus which he had devised upon these principles; and many of his engines were erected for supplying gentlemen's houses with water and other purposes, in different parts of the country. The machine also received many improvements after the death of the original inventor. It was considerably simplified, in particular, by Dr. Desaguliers, about the year 1718; and this gentleman also contrived a method of concentrating the steam by the injection of a small current of cold water into the receiver, instead of the old method employed by Savery, of dashing the water over the outside of the vessel, which cooled it to an unnecessary degree, and occasioned, therefore, a wasteful expenditure of fuel. It was Desaguliers who first introduced the safety-valve into the steam-engine, although Papin had previously suggested such an application of the contrivance. Engines upon Savery's principle have continued to be constructed, down to our own times; and, as they can be made at a comparatively small expense, they are found to answer very well in situations where water has to be raised only a short way. This engine is, in fact, merely a combination of the common sucking-pump (except that the requisite vacuum is produced by the condensation of steam and without the aid of a piston) with the contrivance proposed by De Caus and the Marquis of Worcester for the application of the expansive force of steam;

and, wherever the machine can be economically employed, the former part of it is that which operates with by far the most effect.

Not long after Savery had invented his engine, Thomas Newcomen, an ironmonger, and John Calley, a glazier, both of Dartmouth, in Devonshire, began also to direct their attention to the employment of steam as a mechanic power. Their first engine was constructed about the year 1711. This contrivance, which is commonly known by the name of Newcomen's engine, proceeded mainly upon the principle formerly adopted by Papin, but subsequently abandoned both by him and those who immediately followed him in the cultivation of this department of mechanics, of making the moving power of the machinery the weight of the atmosphere acting upon a piston, so as to carry it down through a vacuum created by the condensation of the steam. Newcomen's apparatus is, on this account, often distinguished by the name of the Atmospheric engine. Its inventors, however, instead of adopting Papin's clumsy method of cooling his steam by the removal of the fire, employed, in the first instance, the expedient of pouring cold water on the containing vessel, as Savery had done before them, though without being aware, it is said, of his prior claim to the improvement. They afterwards exchanged this for the still better method, already described as introduced by Desaguliers into Savery's engine, of injecting a stream of water into the cylinder, which is said to have been suggested to them by the accident of some water having found admission to the steam through a hole which happened to have worn itself in the piston. This engine of Newcomen, which in the course of a very few years after its invention was brought to as high a state of perfection as the principle seems to admit of, afforded the first important exemplification of the value of steam in mechanics. Savery's, the only practical contrivance which had been proposed, had been found quite inadequate to the raising of water from any considerable depth, its principal power, as we have already remarked, lying, in fact, in the part of it which acted as a sucking-pump, and by which, as such, water could only be raised till its column was of equal weight with a column of the atmosphere of the same base. It was nearly useless, therefore, as an apparatus for pumping up water from mines; the grand object for which a moving force of extraordinary power was at this time in demand. But here Newcomen's engine proved of essential service. Many mines that had long remained unwrought, were immediately after its inven-

tion, again rendered accessible, and gradually excavated to great depths; while others were opened, and their treasures sought after with equal success, which but for its assistance could never have been attempted. It was applied also to various other important purposes.

Newcomen's engine, however, notwithstanding its usefulness, especially in cases where no other known power could be applied, was still in some respects a very defective contrivance, and by no means adapted to secure the complete command of the energies of steam. The great waste of fuel, in particular, which was still occasioned by the degree to which the cylinder was cooled after every stroke of the piston, from the cold water injected into it, rendered it scarcely any saving of expense to employ this engine in circumstances where animal power was available. Its whole force too, the reader will observe, as a moving power, was limited to what could be obtained by atmospheric pressure alone, which, even could the vacuum under the piston have been rendered quite perfect, and all obstructions from friction annihilated, could only have amounted to about fifteen pounds for every square-inch of the surface of the piston. The expansive force of steam was not, in fact, at all employed in this contrivance as a moving power; could the vacuum necessary to permit the descent of the piston have been as expeditiously and conveniently produced by any other agency, that of steam might have been dispensed with altogether. An air pump, for instance, attached to the lower part of the cylinder, as originally proposed by Otto Guericke, might have rendered all the service which steam was here called upon to perform; and in that case, this element, with the fuel by which it was generated, might have been dispensed with, and the machine would not have been a steam-engine at all. This view of the matter may, in some degree, account for the complete neglect of steam as a moving power which so long prevailed after Newcomen's engine was brought into use, notwithstanding the proofs of its capabilities in that character which had been afforded by the attempts of the earlier speculators. It was now regarded simply as affording the easiest means of obtaining a ready vacuum, in consequence of its property of rapid condensation on the application of cold: its other property of extraordinary expansion, which had first attracted to it the attention of mechanicians, and presented in reality a much more obvious application of it as a mechanical agent, had been entirely neglected. The only improvements of the engine which were attempted or thought of were such as

referred to what may be called its subordinate mechanism, that is to say, the contrivances for facilitating the alternate supplies of the steam and the water on which its action depended; and after Mr. Beighton had, about the year 1718, made the machine itself shut and open the cocks by which these supplies were regulated, instead of having that service performed as at first by an attendant, there remained little more to be done even in this department. The steam might be applied with more ease and readiness, but not with any augmentation of effect; the power of the engine could be increased only by a more plentiful application of atmospheric pressure. It was with propriety, therefore, that Newcomen's invention was called, not a steam, but an atmospheric engine.

For half a century, accordingly, after the improvements introduced by Beighton, who may be considered as the perfecter of this engine, no further progress worth mentioning was made in the application of steam as an agent in mechanics. The engine itself was more and more extensively employed, notwithstanding its defects; but no better method was proposed of calling into exercise the stupendous powers of the element, which, by means of only one of its remarkable properties, was here shown to be capable of rendering such valuable service. Our knowledge of what might be done by steam was in this state when the subject at last happily attracted the attention of Mr. Watt.

[From the Journal of the Franklin Institute.]

PATENTS.

PATENT *for Manufacturing Butt Hinges of brass, copper, or other metal;* Henry P. Anderson and Josiah Sawyer, Waterford, Saratoga county, New York, June 18.

These hinges are to be made of sheet metal, which is first to be cut into strips, and then drawn through a plate which bends the two edges round so as to form a tube. The opening in the draw plate consists of two holes, united by a slit, or opening, equal to the thickness of the metal. When drawn, the strip is to be slit along the middle, and then cut into lengths by circular cutters.

A machine, called a rotary joint cutter, is employed to form the knuckles, and is constructed as follows. Two wheels of iron, which may be a foot in diameter, and in thickness equal

to the length of the hinge to be made, are placed upon a horizontal shaft. Kerfs are made into these wheels, across their faces, to a depth sufficient to receive the hinge plate. These may be an inch, or more, apart. The cutters which form the joints stand in front of, and revolve close to, these wheels, and receive a rapid motion, whilst that of the wheels must be such as to admit of the pieces being slipped, by hand, into the kerfs, or notches, which hold them while they are cut, and from which they fall after passing the revolving cutters.

'Many parts of our machinery and tools are not new, but we claim as our discovery, the drawing of the metal through dies rolling the edges over, for manufacturing butt hinges. The machine for cutting out the joints, which we call a rotary joint cutter, we claim as our invention. In these two consist the main advantages of our mode of manufacturing butt hinges. On these we rest our claims as to our new and useful improvements, but have given a description of the other parts of the process, so as to enable the public to have the benefit of them.'

[For the Mechanic.]

Messrs. Editors:—Having been pleased with the simplicity and convenience of the above described machinery for the manufacture of hinges, I have taken the liberty to send you a drawing, with references, which, although they may not be perfectly correct, and in exact accordance with the apparatus used by the patentees, yet I believe it is sufficiently correct in regard to principles, to enable your readers to understand it more readily.

Fig. 2. Fig. 3.

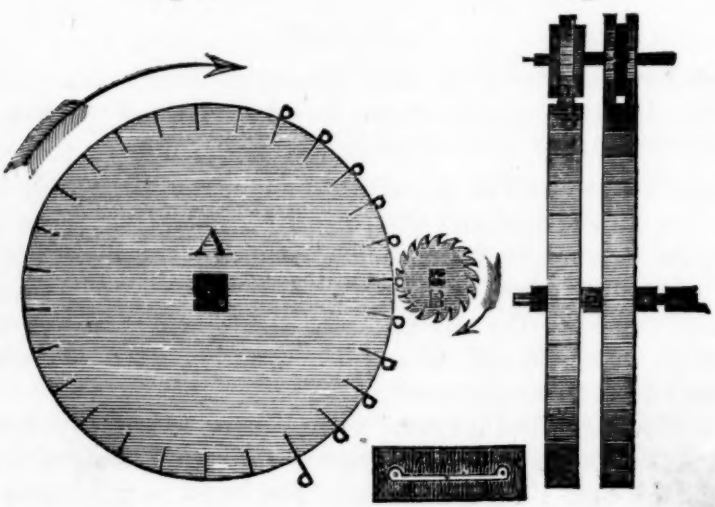


Fig. 1.

Fig. 1. is the draw plate, with the opening of the shape required for the parts of the hinges, before they are separated.

A, Fig. 2 is the large wheel, containing parts of the hinges in the position in which the knuckles are formed by the revolving cutter, B.

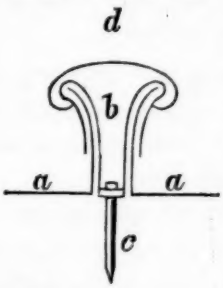
The arrows show the direction in which the wheels revolve.

In Fig. 3 is represented the form of the cutters and the arrangement of the wheels.

Yours, respectfully,

Boston, Jan. 23, 1834. JUNIUS.

PATENT *for an improved mode of Covering the Roofs of Buildings with Sheet Tin and other Rolled Metals;* Charles Bonnycastle, Charlottesville, Albemarle county, Virginia, June 29.



The method here patented is intended to obviate the effects of the expansion and contraction of the metal, which has not been effectually done by the plans most generally pursued. The sketch in the margin is a section of the joinings of the plates, along the plane of the roof, from the eaves to the ridge. The plates *a a* have their edges turned up, and curved a little out; the plate *b* is a strap which is formed of a strip of tin bent over so as to embrace the edges of two contiguous plates, and is nailed down between them by a nail *c*. A tubular piece, *d*, covers over them, and forms a capping that effectually prevents the introduction of rain.

The claim is to the above described mode of fastening sheets of tin, and other rolled metallic plates, to the roofs of buildings; and to the prescribed mode of covering the joints.

[From the Tracts and Lyceum.]

DRAWINGS.

To illustrate the lectures which are given before Lyceums, it is very important to present numerous diagrams, in order to give the assembly the clearest understanding of the subject upon which the lecturer is discoursing. Natural history, mineralogy, botany, geography, and astronomy, cannot be

comprehended by youth, without something on which the eye can rest, while they listen to the speaker. The utility of drawings must be universally admitted; yet but little or no pains is taken to prepare them.

A common reason why drawings are not procured, arises from the difficulty—so it is said—of finding artists in the country, who are competent to the undertaking. This, by the way, is no excuse at all. The man who consents to lecture, could best make the pictures he stands in need of. The practice of a few days, does wonders for a person who would not have supposed it possible to have executed a decent looking plan, of any sort, with a pencil. India ink is the only pigment that is necessary. Paper, however coarse, is as good to represent ideas upon as glazed silk. Where large objects are to be portrayed, as the larger class of animals, common cotton cloth, put upon the stretch, and sized over with flour paste, is excellent. The cloth may be rolled up, and thus be kept for many years, always in a condition to be used.

The author of the above has our thanks for his suggestions. We believe the art of Drawing is an accomplishment that none of our mechanics ought to be ignorant of. It is essential in many trades, and more or less useful to all. We shall devote a portion of our pages to this subject.—Eds. Mec.

MISCELLANY.

Rumford Professorship.—At a recent meeting of the Directors of Harvard University, Mr. Daniel Treadwell, of this city, was appointed Rumford Professor of that Institution.

The object of Count Rumford in establishing this professorship was, to show the application of the Sciences to the Useful Arts, and to the Conveniences of Life. The Count gained an enviable reputation, as well as a fortune, by his labors and researches in this department, and has bequeathed considerable sums of money, both in this country and in Europe, for the encouragement of similar pursuits.

It is necessary to insure success in this undertaking, that the Professor should be thoroughly acquainted with several of the Sciences, and also with the manner of applying their principles to practical uses; and we think it would be difficult to find a more suitable person than Mr. Treadwell, to fill such a situation.

Mr. Treadwell is well known as the inventor of a 'Power Printing Press,' several of which have been in successful operation for some years.

He has also lately made some very important improvements in the manufacture of cordage.

There has been a report in circulation in the papers for some time past, that Mr. Treadwell had invented a machine to be moved by the compression and exhaustion of air, which was to rival the Steam Engine; and the New York Mechanics' Magazine, (Vol. 2, page 294,) having noticed it in such a manner as to render inquiry into its truth necessary, and feeling confident that the impracticability of the scheme was incompatible with the scientific knowledge of Mr. Treadwell, we addressed him upon the subject, and have received the following answer.

Boston, Jan. 27th, 1834.

DEAR SIR:—I have received your note of this morning, referring me to an article in the Mechanics' Magazine, in which it is stated, that 'Mr. Treadwell of Boston, comes forward with a plan so to compress and exhaust the air, as to make it answer all the purposes of steam.'

You desire to know if this statement be correct. I answer, that if I am the Mr. Treadwell designated in the above notice, it is, so far as my name is used, entirely without foundation. I have no knowledge of any *new* mode of obtaining mechanical power, nor have I ever said or written anything which could be construed into a pretension to a discovery of this kind.

Very respectfully, yours,

DANIEL TREADWELL.

IMMERSION OF CONICAL BODIES.—An interesting experiment was put in practice in this dockyard, (Devenport,) a short time since, to prove the fallacy of the naval doctrine, that a floating body, conically shaped, may be more easily immersed with the apex upwards than if it were reversed. A new buoy, accurately shaped, which your readers know is formed like two hollow cones united at their base, was carefully marked round the centre and loaded with iron until it sunk to the middle; it was then taken up and weighed against as much more iron as would exactly balance it, and on being put again into the water, it appeared that the whole of the iron weighed against it was required to immerse the other half of the buoy, which then floated with its top just under the water's edge; thus proving that precisely the same weight was necessary to immerse the upper part of the buoy or cone, with its apex uppermost, as that required to sink the lower half or cone in the inverted position.—UNITED SERVICE JOURNAL.

PORTABLE MILK.—M. Dorchoff, the Russian chemist, who sometime since discovered the process of making starch into sugar, has lately made several experiments upon milk, the result of which he has arrived at is curious. He is said to have found a mode of keeping milk for use for any definite space of time. The process of preserving is this:—He causes new

milk to be evaporated over a slow fire, until it is reduced to powder. This powder is then put into a bottle, which is hermetically sealed. When the milk is wanted for use, it is only to dissolve some of the powder in a suitable quantity of water, and the mixture so dissolved will have all the qualities as well as the taste of milk.—Ed. Agri. Jour. & New Ed. Philos. Jour.

Stucco for Walls.—In Italy great use is made of a stucco which gives to the walls the brilliancy, the cleanliness, and almost the hardness of marble. It may be variously colored, to suit the taste of the employer. This stucco is made very easily, by mixing lime and pulverised marble in nearly equal proportions, according to the meagreness or richness of the marble. A paste, or mortar, is made of this mixture, and applied to the wall in the thickness of a five franc piece, with a trowel wet with soap suds, and in such a way that the whole of the wall may be finished in the same day. None but mineral colors should be mixed with the stucco, as the lime would destroy those derived from the vegetable kingdom. To obtain the greatest brilliancy, the mortar should be applied with a cold trowel. Workmen, for the sake of ease and expedition, usually employ it warm. Chips and fragments of marble may be advantageously employed for this purpose. In cases where the appearance of a marble wall would be objectionable on account of its coldness, any portion of it may be covered with paper.—New Ed. Philos. Jour.

[Communication.]

Messrs. Editors:—I consider the Lucifer Matches to be the best means known of obtaining a light; but I think the venders are imposing upon the public by the exorbitant price they demand.

I have sent you a method of making them;—perhaps it will be useful to some of your readers.

Take 2 parts (by weight) of the Sulphuret of Antimony, and 1 part of Chlorate of Potash. Grind both to a fine powder, and make them into a paste with a solution of Glue.

Common brimstone matches are to be dipped into it, and when dry they will inflame by being drawn through a folded piece of sand-paper.

Yours, &c., C. D.

The Mechanic.—Our readers will perceive that it was out of the power of the editors to make this number in all respects a fair specimen of the work under the new arrangements, when they are informed that these arrangements were not fully decided upon till about the middle of this month. We are conscious of several important defects, which no pains

will hereafter be spared to avoid. We refer in particular to the want of more matter of a strictly practical character. It will be one of the main objects of the editors, to make the Magazine, not only interesting and instructive, but of as much practical utility as possible to mechanics in every department of business; and they hope that the respected patrons of the work will be able to say at the end of the year, that it has been worth to them, in a *pecuniary* point of view, much more than its cost.

The cut on the first page, is intended to represent the effect of the cultivation of the Arts and Sciences upon Civilization, by contrasting the wigwam and canoe of the savage with the present habitations of the city and country, and the steamboat and railway—some of the prominent results of this cultivation.

We are confident of having the aid of many valuable correspondents, in the prosecution of our labors; and, the Association having made arrangements for the proper execution of the work in its various departments, we trust that it will deserve, as we hope it will meet with, an extensive circulation.

Communications are requested from any individuals in possession of information suitable for our pages, or who desire knowledge relating to any of the processes of Art or the principles of Science. We would remind our correspondents, that when drawings accompany their papers, they should not be more than 3 5-8 inches in length.

We shall in future endeavor to embody a greater and more acceptable variety than we have been able to do in this number.

QUESTIONS.

Required, the root of the greatest square, that may be cut out of a circle whose diameter is 10 inches?

Required, the root of the greatest cube, that may be sawed out of a globe whose diameter is 10 inches?

What is the difference of the pressure sustained by two gates made to dam up a river or canal, the first of which is 20 feet long at the top, and 16 feet at the bottom, with 25 feet depth of water, and the second gate being in the form of a right angled parallelogram, the length of which is 18 feet, and depth of water as in the former case?

ANSWER.

We thank a correspondent for an answer to the following question proposed at page 100, Vol. 2, of this work.

'WHAT is the weight sustained by a pile, when a cast iron hammer of one ton weight is let fall from a perpendicular height of 39 feet, with nothing to impede its force?'

MESSRS. EDITORS.—So long ago as last June, I noticed a question in the Mechanic, respecting the weight sustained by a pile when driven into the earth by a cast iron hammer. I suppose every one has been, like myself, delaying it to have some other one answer it; but as I have not noticed any answer to the question, I now present to you the following solution, and should I happen to be wrong, I will thank some of your correspondents to set me right.

In the first place, it is known by the doctrine of mechanics, that the velocity of falling bodies is as the times of falling, and the spaces in proportion to the squares of the time, or as the square of the velocity. It is also found by experiment, that a body falls 16 feet in the first second of time, and at the end of that time has acquired a velocity double, or 32. We propose in the first place, to determine the time it requires for the hammer to fall.

Let t = Time,
" v = Velocity,
" 39 ft. = Space.

} Two things being given the third is easily found, i. e. the time is equal to the square root of twice the space divided by 32.

$$i.\ e.\ t = \sqrt{\frac{78}{32}} = 1{\cdot}58 + \text{ that is, the time of falling is } = 1{\cdot}58 \text{ seconds.}$$

Again, let v = Velocity,
1·58 = Time,
39 ft. = Space.

$v = 32 \times 1{\cdot}58 = 50{\cdot}56$, i. e. the velocity is equal to 32, or the velocity that it has acquired, at the end of one second, multiplied by the time of falling, this quantity, viz. 50·56, multiplied by the weight of the hammer, gives 50·56 tons for the answer. E. G.